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TRACHOMA.

A SURVEY OF ITS PREVALENCE IN THE MOUNTAIN SECTION OF EASTERN KENTUCKY.

By JOHN McMULLEN, Surgeon. United States Public Health Service.

The following is a report of investigations conducted in the eastern or mountainous section of the State of Kentucky for the purpose of determining the prevalence of trachoma.

The Original Survey in 1912.

The original survey in 1912¹ included the counties of Knott, Perry, Leslie, Breathitt, Lee, Owsley, and Clark, all of which are mountain counties, with the exception of Clark, which is in the blue grass region, although bordering on the mountains. In these seven counties 3,974 persons were then examined and 500 of them, or 12½ per cent, found to be suffering from trachoma.

Extent of Present Survey.

The present investigation has included 23 counties, all but 3 of which—namely, Clark, Fayette, and Anderson—are in the eastern or mountainous section of the State.

Scope of the Survey.

A detailed survey was made in all these 23 counties, several sections of each county being visited for the purpose of locating the most heavily infected portions. While the disease has been found widely scattered, it is not evenly distributed, but exists in nests, so to speak, and some sections are comparatively free from it.

A total of 18,016 persons were examined, and 1,280, or practically 7 per cent, were found to be suffering with trachoma. Of this number 16,696 were school children and 1,324 were persons examined outside of the schools.

Only a small number of negroes were examined, since there are very few in the mountains. The census of 1910 gives only about 13,000 blacks in a population of 561,861 in the 35 mountain counties.

(¹) See reprint No. 101 from the Public Health Reports.

In only 5 counties do they exceed 1,000, while in 12 counties they are less than 100. It has also been stated that in only 6 counties do foreigners exceed 100, and in 16 counties there are fewer than 10.

The type of the disease found in this section is very severe and its mutilating effects are seen everywhere. In order to fully appreciate the suffering among the victims of this disease one would have to actually see these cases in Kentucky. The disease untreated remains more or less throughout the lifetime of the individual a constant bodily discomfort to himself, damages his eyesight, and constitutes him a menace to his neighbor.

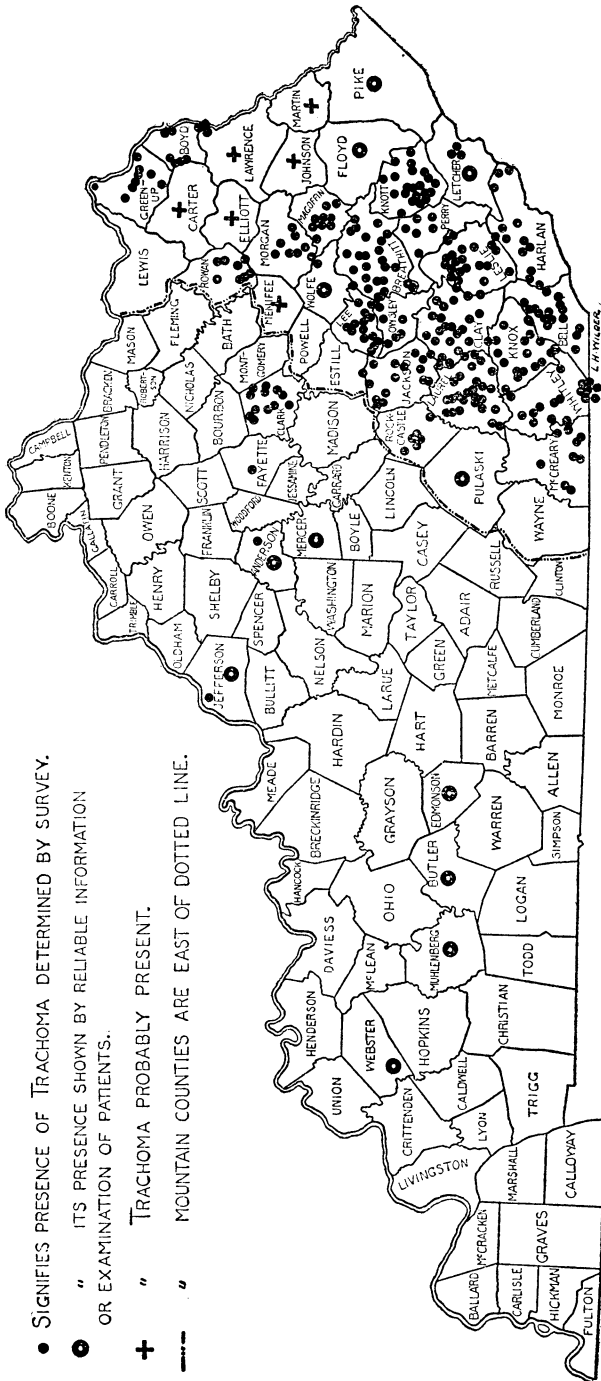
County.	Total number examined.	Number cases trachoma.	Trachoma, per cent.	County.	Total number examined.	Number cases trachoma.	Trachoma, per cent.
Morgan.....	468	45	9.6	Greenup.....	303	31	10.2
Magoffin.....	367	79	21.5	Anderson.....	478	40	8.3
Wolfe.....	45	11	24.4	Fayette.....	3,844	109	2.8
Laurel.....	1,485	53	3.5	Knott.....	1,059	221	20.8
Clay.....	1,209	134	11.0	Perry.....	310	52	16.7
Jackson.....	694	62	8.9	Leslie.....	110	29	26.4
Knox.....	1,007	60	5.9	Breathitt.....	614	77	12.5
Whitley.....	1,001	28	2.7	Lee.....	668	57	8.5
McCreary.....	232	4	1.7	Owsley.....	700	21	3.0
Bell.....	1,057	28	2.6	Clark.....	436	15	3.4
Hartan.....	1,038	62	5.9	Miscellaneous.....	77	25	
Rockcastle.....	367	13	3.5				
Rowan.....	447	24	5.4	Total.....	18,016	1,280	7.1

Preventive Measures.

In making the investigation every opportunity was taken advantage of for making talks in the schools, churches, etc., relative to the communicability of trachoma and the danger to the eyesight. Trachoma literature was also freely distributed. The names of all children found to be suffering with trachoma were given to the teacher with the request that the parents be immediately notified that treatment should be given without delay. They were informed that free treatment would be given at the service trachoma hospitals at Jackson, Hindman, or Hyden. A duplicate list was forwarded by the examining officer to the central office at Lexington, Ky., and literature on "Trachoma, its nature and prevention," was immediately mailed to the parents and guardians and, as a rule, the county health officer was notified of these cases.

Prevalence of Trachoma in Kentucky.

The mountain section of eastern Kentucky includes 35 counties, and of these 20 have been investigated to determine the prevalence of trachoma. In four of the others the disease is known to exist, as cases have been treated at the several trachoma hospitals from these four counties. In six of them, by reason of the proximity to other



U.S. PUBLIC HEALTH SERVICE

Map of Kentucky, showing prevalence of trachoma.

infected counties, manner of living, etc., it is believed that the disease is present and would be found if actually investigated as in the other 20 counties. While the other five have not been investigated and have not furnished patients to any of the hospitals, it would only be fair to assume that an actual investigation of conditions would show the presence of the disease.

Outside of the mountain sections which have been investigated the disease has been found to exist to a surprising extent in the three blue grass counties in central Kentucky. Reports received from reliable sources indicate that trachoma is also present in the western portion of the State, particularly in the counties of Muhlenburg, Butler, and Edmonson. An investigation made by the service in the winter of 1913-14 of the school children in Jefferson County showed that 805 of them had trachoma. (See reprint No. 196 from the Public Health Reports.) It would not be surprising therefore, to find, upon investigation, that the disease was present in practically every county in the State.

While it is not possible to estimate with any degree of accuracy the number of cases of trachoma in the State, or even the eastern section of the State, we have sufficient data to warrant the belief that there are thousands of people suffering with this disease. It must be remembered that the majority of the cases found were among school children, and this can be taken as an index of home conditions. Reference to the accompanying table shows that the total population (Census 1910) of the 20 mountain counties is practically 300,000. The general average of trachoma found among the people examined in these counties was 8 per cent. If the same rate of prevalence would exist among the rest of the population, there would be 24,000 cases of the disease in 20 of the 35 mountain counties. Deducting 25 per cent for possible error, we would have 18,000 trachoma cases in these 20 counties, and this would appear to be a conservative estimate. Estimating that the other 15 mountain counties have 250,000 population and the same amount of infection, this would add 15,000 more trachoma cases, making a total of 33,000 cases of this communicable eye disease in the eastern or mountain section of the State alone.

The following table shows the 20 mountain counties which were investigated to determine the prevalence of trachoma, with the population of each and the estimated number of trachoma cases. The general average of trachoma in the 20 counties was shown by survey to be 8 per cent. Allowing for a possible error of 25 per cent in the estimate, the number of cases has been estimated on the basis of 6 per cent.

Name of county.	Popula- tion cen- sus 1910.	8 per cent.	6 per cent.	Name of county.	Popula- tion cen- sus 1910.	8 per cent.	6 per cent.
Bell.....	28,447	2,275	1,706	Leslie.....	8,976	718	538
Breathitt.....	17,540	1,403	1,052	Magoffin.....	13,654	1,092	819
Clay.....	17,889	1,431	1,073	Morgan.....	16,259	1,300	975
McCreary.....	10,159	812	609	Owsley.....	7,974	637	478
Greenup.....	18,475	1,478	1,108	Perry.....	11,255	900	675
Harlan.....	10,566	845	633	Rockcastle.....	14,473	1,157	868
Jackson.....	10,734	858	644	Rowan.....	9,438	755	566
Knott.....	10,791	863	647	Whitley.....	31,982	2,558	1,918
Knox.....	22,116	1,769	1,326	Wolfe.....	9,864	789	591
Laurel.....	19,872	1,589	1,192				
Lee.....	9,531	762	571	Total.....	299,995	23,991	17,989

Preventive Measures Urgently Needed.

As a large number of cases are known to exist in the other sections of the State the urgency of beginning the work of eradication and prevention becomes apparent. There is abundant evidence that trachoma is increasing, and, should history again repeat itself, every condition is present for a repetition of the fearful epidemics of this disease experienced in Europe in the nineteenth century.

These thousands of cases of trachoma known to exist in Kentucky should be given prompt relief, both from a public health standpoint to prevent the further spread of the disease and to save the patient from becoming a burden to himself and to his friends, and often a public charge. The service has demonstrated that trachoma hospitals can be operated at a comparatively small cost. It is now the duty of the State and local authorities to establish a sufficient number of these hospitals in the infected regions to be within easy reach of the trachoma patients.

The investigation in a number of the mountain counties in the northeastern and southeastern section of the State was made by Asst. Surg. Joseph G. Wilson.

The assistance of Acting Asst. Surgs. T. F. Wickliffe, Russell W. Raynor, Joe C. Johnston, Pharmacist Charles G. Carlton, and Head Nurse Mae Hicks are gratefully acknowledged.

Acknowledgment is made of the thorough cooperation and support given in this work by the State board of health. The assistance and cooperation of the county and city officials, local physicians, county school superintendents, school-teachers, and other citizens is gratefully acknowledged.

Prevalence of Trachoma in Each County Surveyed.

MORGAN COUNTY.

There were 468 school children examined in nine schools situated in various sections of the county. Of this number 45, or practically 10 per cent, were found to have trachoma. The heaviest infection was found in a school situated nearly in the center of the county which showed an infection of 17.3 per cent. The least infected school was in a more southerly part of the county with an infection of 1.6 per cent.

MAGOFFIN COUNTY.

A number of patients from this county had already been treated in the Service Trachoma Hospital at Jackson.¹ There were nine schools visited, 367 pupils examined and 79 cases of trachoma found among them. This was one case in every five of those examined, or about 21 per cent. The most heavily infected school showed a trachoma percentage of 48.4, or nearly one half of the pupils examined were suffering from trachoma. This school was situated in the northern part of the county. The least infected school, situated near the center of the county, showed an infection of 4.2 per cent. Some of the worst cases treated at the Jackson hospital came from this county.

WOLFE COUNTY.

Only one school, with 45 pupils, was examined in this county, and 11 of these pupils or about 25 per cent, had trachoma. Although only a limited survey has been made in this county, a number of cases of trachoma from there have been treated in the Service Trachoma Hospital at Jackson, and doubtless the infection is about the same as the neighboring counties.

LAUREL COUNTY.

There were 1,485 school children examined in the 23 schools visited in this county and 53 of them, or 3.5 per cent, had trachoma. The most heavily infected school was found in about the center of the county and showed an infection of 8.6 per cent. Several of the schools in this county showed no infection. At the time of the inspection the attendance at the public schools in the county was considerably below the average on account of the older boys remaining at home to help in harvesting the crops. There is rather a low percentage of trachoma in this county, particularly in the western portion. One of the schools examined was colored, with 44 pupils, among whom no case of the disease was found.

CLAY COUNTY.

The survey of this county extended to practically all sections and 28 schools were visited with a total population of 966. Of this number, 115, or more than 11 per cent, were found to be suffering from trachoma. The most heavily infected school was found in the northern part of the county and showed an infection of 42 per cent. The infection in Clay County is general and heavy.

In the opinion of the examiner the percentage of 11 per cent in this county underestimates the amount of trachoma, as the county superintendent of public schools states that there are a good many children away from school on account of their eyes. He also states that in one school examined, where 100 children were in attendance, 20 cases of trachoma were found, and it appeared that the whole school was contracting the disease. In this school there were a great many cases of acute conjunctivitis which were not included in the 20 cases noted. The evidence would seem to indicate that the disease is rapidly spreading to nearly all the communities. One of these schools was colored, with 30 pupils, and no trachoma was found. Some of the schools in the eastern part of the county were found not to be infected. A house to house canvass on Elk Creek showed 7 cases of trachoma among the 43 persons examined, or 16 per cent. Of 200 people examined on Martin Creek at the Baptist Association meeting, 12, or 6 per cent, were found to have trachoma. More than 7 per cent of the population (census of 1910) were examined.

¹See annual report U. S. Public Health Service, 1914.

JACKSON COUNTY.

There were 627 persons examined in the schools and 58, or 9.2 per cent, were found to be suffering with trachoma. Nineteen schools were visited in this county, all being white, as there are no colored people in Jackson County. While the prevalence of trachoma in Jackson County was found to be about 10 per cent among the school population, it apparently does not represent the gravity of the situation. Many schools were found to be heavily infected. One in the northern part of the county showed 17 cases among the 50 pupils present, with the teacher herself suffering from this disease. In one school 34 per cent of the pupils suffered with trachoma. Several other schools in widely different sections of the county showed an infection of over 25 per cent. In the sparsely settled timberland in the central portion of the county there was not much trachoma found, but every border section of the county was heavily infected. There are only about 72 schools in this county, with an enrollment of 4,000 pupils, and about one-sixth of the total enrollment was seen. Sixty-seven persons were examined in a routine way outside of the schools and 4 cases of trachoma were found among this number. More than 6 per cent of the population (census of 1910) were examined.

KNOX COUNTY.

There were 1,007 persons examined in this county. Of this number, 989 were inspected in schools, where 56 cases of trachoma were found, or 5.6 per cent, in the 28 schools examined. The most heavily infected school was in the northeastern part of the county, where 25 per cent of the pupils had the disease.

Outside of the schools 18 people were examined and 4, or 22 per cent, of them had trachoma. The districts in the neighborhood of Hopper, near the headwaters of Goose Creek, show trachoma infection of about 10 per cent, which is similar to that of the adjoining parts of Clay County. The Stinking Creek section, commencing at Mill School and ending at Old Flat Lick School, and along the Cumberland River section as represented by the schools at Mackey Bend, Swan Pond, and Logan Gap, show a heavy infection. The mining district at Wilton, in the western part, shows little trachoma. Of the 28 schools examined 23 were rural and 5 were in town.

In the rural districts and schools 616 persons were examined and 390 examined in the town. The percentage of persons having trachoma in the rural population was 8.7 per cent, while the percentage found in town population was 1.5 per cent. This is further proof of previous statements to the effect that more trachoma is found in the rural or remote sections than in the towns and villages. All but 6 of these trachoma cases were found in the remote country districts.

WHITLEY COUNTY.

A total of 16 schools were visited and 1,001 pupils examined. Of this number 28, or 2.7 per cent only, were found to have trachoma. The highest percentage in any one school was 15.5 per cent, while in several of the schools no trachoma was found. One colored school with 40 pupils showed no trachoma.

M'CREARY COUNTY.

Only 7 schools, with 232 pupils were examined. Among these there were 4 cases of trachoma or 1.7 per cent. The school showing the highest infection was the Ball School, at Pine Knot, in the southern part of the county, which had 6.8 per cent trachoma.

Doubtless had a larger number of schools been visited and the eyes of the children examined, trachoma would have been found in about the same percentage as in the neighboring counties.

BELL COUNTY.

This is a county that has the distinction of having an all-time health officer. Of the 1,042 school children examined in the 20 schools visited, 26 cases of trachoma, or 2.4 per cent, were found. Outside of the schools 15 persons were examined, 2 of whom suffered with trachoma; there were therefore 28 cases of trachoma among the 1,057 persons examined, or a general average of 4.3 per cent. The mining industry in this county is very well developed. In only one mining region, Ralston on Stoney Creek, was there evidence of serious trachoma infection, but the local doctor was of the opinion that it was not now so common as it was some years ago, as treatment had been afforded. The most heavily infected school in this county showed 18.5 per cent of trachoma, while in a number of schools examined, no trachoma was found.

HARLAN COUNTY.

A total of 1,038 persons were examined in this county; 816 were school children and 19, or 2.3 per cent, suffered from trachoma out of 13 schools visited; 222 people were examined outside of the schools and 43, or 19.3 per cent, had trachoma. The examination in this county indicated that the mining camps and the rural schools were fairly free from the disease. However, on the north side of Pine Mountain there is an isolated community in the neighborhood of the Pine Mountain Settlement, scattered along the waters of Greasy Creek, Laurel Creek, Big Laurel Creek, and Abners Branch, where the disease is very prevalent and affects practically every family in the community. Of the 264 examined in this section 53, or about 20 per cent, had trachoma. The examination was made of all ages and both sexes indiscriminately and it is thought that this represents the condition of the community in reference to trachoma. In this heavily infected section many people were rendered unable to earn a livelihood, and many children were kept from school on account of the disease. The physical discomforts and visual impairment seen in these cases presented a pathetic picture.

ROCKCASTLE COUNTY.

The survey in this county was undertaken principally on account of its location between the blue-grass region on one side and the mountain on the other. Six schools were visited, 319 pupils examined, and 3, or 0.9 per cent, had trachoma. Outside of the schools 48 persons were examined and 10 cases of trachoma, or 20.9 per cent, were found. It appears that the trachoma in this county is mostly found in that part lying nearest to Jackson. There appears to be a trachoma center in the vicinity of Mullen post office and extending in a southeastern direction toward Dango in the edge of Jackson County.

ROWAN COUNTY.

There were 447 school children examined and 24, or 5.3 per cent, had trachoma in the 13 schools examined in this county. The most highly infected school showed 25 per cent of this disease. It appears that there are only about 50 schoolhouses in this county, which are widely scattered, and this, together with the fact that attendance in the rural schools was very small, made it necessary to cover a large area of territory for the purpose of examining a small number of persons. Of the 13 schools visited 11 were rural and 2 were town schools, and, as usual, the percentage of trachoma found in the former was considerably more than in the latter.

GREENUP COUNTY.

There were 9 schools visited and 303 children examined. Of this number 31, or 10 per cent, suffered with trachoma. The most heavily infected school had 28 per cent of trachoma. The western portion of this county was not examined.

ANDERSON COUNTY.

The Lawrenceburg graded school, with 324 pupils, was examined and 8 cases of trachoma were found among them. This was a little more than 2.26 per cent. The Lawrenceburg High School, with 85 pupils, was examined and 2 cases of trachoma, or 2.3 per cent, were found. Of the 409 pupils examined, therefore, 10 of them had trachoma. Besides the 10 positive cases there were 7 which were classed as suspicious, the majority of which were probably acute or beginning cases of trachoma. In the office of the county health officer 55 persons were examined and 15, or 27 per cent, were found to have trachoma. It had been advertised, however, that an eye clinic was to be held on that day, which accounts to a great extent for the high percentage of trachoma found. Of the 464 people examined in and outside of the schools 25 of them, or 3.4 per cent, were found to have trachoma. On a later visit to Lawrenceburg at the invitation of the county health officer 12 additional cases presented themselves for examination and treatment. This county is in the heart of the blue-grass region, which has been supposed to be more or less free from the disease. The people of Lawrenceburg immediately upon learning that trachoma existed among them to this extent established a small hospital. Upon their request I spent several days assisting in opening the hospital and operating on these cases.

FAYETTE COUNTY.

The nine graded schools of Lexington, in which 3,844 pupils were examined, showed 109 positive cases of trachoma and 25 suspicious cases. This gives an infection of 3.8 per cent in the graded schools of Lexington. One thousand and fifty-seven of these school children were negroes, among whom only 7 cases of trachoma were found. Of the 2,787 white children, 102 cases of trachoma were found, which shows a percentage of 3.65 of the white children in the graded schools to be suffering from trachoma.

I have been requested by the county school superintendent to examine the country schools, and this will be done as soon as possible. There are about 3,000 children in these schools. At the request of the secretary of the prison commission at Frankfort I will examine the inmates of the State houses of reform at Greendale, Fayette County, for the purpose of determining the prevalence of trachoma there. There are about five or six hundred in the houses of reform.

SANITARY PROGRESS.

COUNTY OF NEW HANOVER AND CITY OF WILMINGTON, N. C.

By C. W. STILES, Professor of Zoology, Hygienic Laboratory, United States Public Health Service.

Attention has been previously invited to the sanitary campaign in New Hanover County, N. C., and its county seat, Wilmington.¹

A few weeks ago it was possible to report that Cape Fear Township, of this county, had a privy at every home and at every school. This township has an area of 63.43 square miles and a population of 1,605 persons.

A second township—namely, Masonboro—is now in the same condition, according to the reports of the sanitary police.

¹ Public Health Reports, Dec. 4, 1915, p. 3251.